



#4

SEQUENCE LISTING

<110> OHTAKI, HIROMI

NAKAMURA, JUN

IZUI, HIROSHI

NAKAMATSU, TSUYOSHI

<120> BACTERIUM PRODUCING L-GLUTAMIC ACID AND METHOD FOR PRODUCING L-GLUTAMIC ACID

<130> 210213US0

<140> 09/895,382

<141> 2001-07-02

<150> JP 2000-204256

<151> 2000-07-05

<160> 34

<170> PatentIn version 3.1

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tgcgttacac caaggtcgct tctgaacacg aggaagctca gccaaagaag gctacaaagc 360
ggactcgtaa ggctaccagc taagaaggct gctgctaaga aaacgaccaa gaagaccact 420
aagaaaacta ctaaaaagac caccgcaaag aagaccacaa agaagtctta agccggatct 480

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Met	Asp	Asp	Ser	Asn	Ser	Phe	Val	Val	Val	Ala	Asn	Arg	Leu	Pro	15	
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gtg	gat	atg	act	gtc	cac	cca	gat	ggg	agc	tat	agc	atc	tcc	ccc	agc	576
Val	Asp	Met	Thr	Val	His	Pro	Asp	Gly	Ser	Tyr	Ser	Ile	Ser	Pro	Ser	
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ccc	ggg	ggc	ctt	gtc	acg	ggg	ctt	tcc	ccc	gtt	ctg	gaa	caa	cat	cgt	624
Pro	Gly	Gly	Leu	Val	Thr	Gly	Leu	Ser	Pro	Val	Leu	Glu	Gln	His	Arg	
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gga	tgt	tgg	gtc	gga	tgg	cct	gga	act	gta	gat	gtt	gca	ccc	gaa	cca	672
Gly	Cys	Trp	Val	Gly	Trp	Pro	Gly	Thr	Val	Asp	Val	Ala	Pro	Glu	Pro	
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Phe	Arg	Thr	Asp	Thr	Gly	Val	Leu	Leu	His	Pro	Val	Val	Leu	Thr	Ala	
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agt	gac	tat	gaa	ggc	ttc	tac	gag	ggc	ttt	tca	aac	gca	acg	ctg	tgg	768
Ser	Asp	Tyr	Glu	Gly	Phe	Tyr	Glu	Gly	Phe	Ser	Asn	Ala	Thr	Leu	Trp	
80					85					90					95	
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Pro	Leu	Phe	His	Asp	Leu	Ile	Val	Thr	Pro	Val	Tyr	Asn	Thr	Asp	Trp	
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tgg	cat	gcg	ttt	cgg	gaa	gta	aac	ctc	aag	ttc	gct	gaa	gcc	gtg	agc	864
Trp	His	Ala	Phe	Arg	Glu	Val	Asn	Leu	Lys	Phe	Ala	Glu	Ala	Val	Ser	
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Gln	Val	Ala	Ala	His	Gly	Ala	Thr	Val	Trp	Val	Gln	Asp	Tyr	Gln	Leu	
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Leu	Leu	Val	Pro	Gly	Ile	Leu	Arg	Gln	Met	Arg	Leu	Asp	Leu	Lys	Ile	
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ggg	ttc	ttc	ctc	cac	att	ccc	ttc	cct	tcc	cct	gat	ctg	ttc	cgt	cag	1008
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cct ttt aaa gac ggt atg aac ttg gtg gct aaa gaa ttc gtg gcc aac Pro Phe Lys Asp Gly Met Asn Leu Val Ala Lys Glu Phe Val Ala Asn 385 390 395	1680
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gcc act gag ctg acc ggt gcg tat tta tgc aac cca ttt gat gtg gaa 1776
 Ala Thr Glu Leu Thr Gly Ala Tyr Leu Cys Asn Pro Phe Asp Val Glu
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 Ser Ile Lys Arg Gln Met Val Ala Ala Val His Asp Leu Lys His Asn
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ccg gaa tct gcg gca acg cga atg aaa acg aac agc gag cag gtc tat 1872
 Pro Glu Ser Ala Ala Thr Arg Met Lys Thr Asn Ser Glu Gln Val Tyr
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acc cac gac gtc aac gtg tgg gct aat agt ttc ctg gat tgt ttg gcg 1920
 Thr His Asp Val Asn Val Trp Ala Asn Ser Phe Leu Asp Cys Leu Ala
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cag tcg gga gaa aac tca tgaaccgcgc acgaatcgcg accataggcg 1968
 Gln Ser Gly Glu Asn Ser
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Cys Trp Val Gly Trp Pro Gly Thr Val Asp Val Ala Pro Glu Pro Phe
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Arg Thr Asp Thr Gly Val Leu Leu His Pro Val Val Leu Thr Ala Ser
65 70 75 80

Asp Tyr Glu Gly Phe Tyr Glu Gly Phe Ser Asn Ala Thr Leu Trp Pro
85 90 95

Leu Phe His Asp Leu Ile Val Thr Pro Val Tyr Asn Thr Asp Trp Trp
100 105 110

His Ala Phe Arg Glu Val Asn Leu Lys Phe Ala Glu Ala Val Ser Gln
115 120 125

Val Ala Ala His Gly Ala Thr Val Trp Val Gln Asp Tyr Gln Leu Leu
130 135 140

Leu Val Pro Gly Ile Leu Arg Gln Met Arg Leu Asp Leu Lys Ile Gly
145 150 155 160

Phe Phe Leu His Ile Pro Phe Pro Ser Pro Asp Leu Phe Arg Gln Leu
165 170 175

Pro Trp Arg Glu Glu Ile Val Arg Gly Met Leu Gly Ala Asp Leu Val
180 185 190

Gly Phe His Leu Val Gln Asn Ala Glu Asn Phe Leu Ala Leu Thr Gln
195 200 205

Gln Val Ala Gly Thr Ala Gly Ser His Val Gly Gln Pro Asp Thr Leu
210 215 220

Gln Val Ser Gly Glu Ala Leu Val Arg Glu Ile Gly Ala His Val Glu

225

230

235

240

Thr Ala Asp Gly Arg Arg Val Ser Val Gly Ala Phe Pro Ile Ser Ile
 245 250 255

Asp Val Glu Met Phe Gly Glu Ala Ser Lys Ser Ala Val Leu Asp Leu
 260 265 270

Leu Lys Thr Leu Asp Glu Pro Glu Thr Val Phe Leu Gly Val Asp Arg
 275 280 285

Leu Asp Tyr Thr Lys Gly Ile Leu Gln Arg Leu Leu Ala Phe Glu Glu
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Leu Leu Glu Ser Gly Ala Leu Glu Ala Asp Lys Ala Val Leu Leu Gln
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Val Ala Thr Pro Ser Arg Glu Arg Ile Asp His Tyr Arg Val Ser Arg
 325 330 335

Ser Gln Val Glu Glu Ala Val Gly Arg Ile Asn Gly Arg Phe Gly Arg
 340 345 350

Met Gly Arg Pro Val Val His Tyr Leu His Arg Ser Leu Ser Lys Asn
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Asp Leu Gln Val Leu Tyr Thr Ala Ala Asp Val Met Leu Val Thr Pro
 370 375 380

Phe Lys Asp Gly Met Asn Leu Val Ala Lys Glu Phe Val Ala Asn His
 385 390 395 400

Arg Asp Gly Thr Gly Ala Leu Val Leu Ser Glu Phe Ala Gly Ala Ala
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Thr Glu Leu Thr Gly Ala Tyr Leu Cys Asn Pro Phe Asp Val Glu Ser
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Ile Lys Arg Gln Met Val Ala Ala Val His Asp Leu Lys His Asn Pro

435

440

445

Glu Ser Ala Ala Thr Arg Met Lys Thr Asn Ser Glu Gln Val Tyr Thr
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 Met Ala Arg Pro Ile Ser Ala Thr Tyr Arg
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ggc atg gag ggt ctt cga gat ctt gct gca gct aca cac gag ttg ggc Gly Met Glu Gly Leu Arg Asp Leu Ala Ala Thr His Glu Leu Gly 75 80 85 90	351
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gac ggc gca acg ggc agt ttc ctc cta caa aac ctg ctg ggc gta tgg Asp Gly Ala Thr Gly Ser Phe Leu Leu Gln Asn Leu Leu Gly Val Trp 540 545 550	1743
ccc gcc gac ggc gtg atc acc gat gcg ctg cgc gat cga ttc agg gaa Pro Ala Asp Gly Val Ile Thr Asp Ala Leu Arg Asp Arg Phe Arg Glu 555 560 565 570	1791
tac gcc cta aaa gct atc cgc gaa gca tcc aca aaa acc acg tgg gtg Tyr Ala Leu Lys Ala Ile Arg Glu Ala Ser Thr Lys Thr Thr Trp Val 575 580 585	1839
gac ccc aac gag tcc ttc gag gct gcg gtc tgc gat tgg gtg gaa gcg Asp Pro Asn Glu Ser Phe Glu Ala Ala Val Cys Asp Trp Val Glu Ala 590 595 600	1887
ctt ttc gac gga ccc tcc acc tca tta atc acc gaa ttt gtc tcc cac Leu Phe Asp Gly Pro Ser Thr Ser Leu Ile Thr Glu Phe Val Ser His 605 610 615	1935
atc aac cgt ggc tct gtg aat atc tcc tta ggt agg aaa ctg ctg caa Ile Asn Arg Gly Ser Val Asn Ile Ser Leu Gly Arg Lys Leu Leu Gln 620 625 630	1983

atg gtg ggc gct gga atc ccc gac act tac caa gga act gag ttt tta Met Val Gly Ala Gly Ile Pro Asp Thr Tyr Gln Gly Thr Glu Phe Leu 635 640 645 650	2031
gaa gac tcc ctg gta gat ccc gat aac cga cgc ttt gtt gat tac acc Glu Asp Ser Leu Val Asp Pro Asp Asn Arg Arg Phe Val Asp Tyr Thr 655 660 665	2079
gcc aga gaa caa gtc ctg gag cgc ctg caa acc tgg gat tgg acg cag Ala Arg Glu Gln Val Leu Glu Arg Leu Gln Thr Trp Asp Trp Thr Gln 670 675 680	2127
gtt aat tcg gta gaa gac ttg gtg gat aac gcc gac atc gcc aaa atg Val Asn Ser Val Glu Asp Leu Val Asp Asn Ala Asp Ile Ala Lys Met 685 690 695	2175
gcc gtg gtc cat aaa tcc ctc gag ttg cgt gct gaa ttt cgt gca agc Ala Val Val His Lys Ser Leu Glu Leu Arg Ala Glu Phe Arg Ala Ser 700 705 710	2223
ttt gtt ggt gga gat cat cag gca gta ttt ggc gaa ggt cgc gca gaa Phe Val Gly Gly Asp His Gln Ala Val Phe Gly Glu Gly Arg Ala Glu 715 720 725 730	2271
tcc cac atc atg ggc atc gcc cgc ggt aca gac cga aac cac ctc aac Ser His Ile Met Gly Ile Ala Arg Gly Thr Asp Arg Asn His Leu Asn 735 740 745	2319
atc att gct ctt gct acc cgt cga cca ctg atc ttg gaa gac cgt ggc Ile Ile Ala Leu Ala Thr Arg Arg Pro Leu Ile Leu Glu Asp Arg Gly 750 755 760	2367
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agg ctc acc ggg caa cgc ttc agt ggt gtt gtc cca gcc acc gat ttg Arg Leu Thr Gly Gln Arg Phe Ser Gly Val Val Pro Ala Thr Asp Leu 780 785 790	2463
ttc tca cat tta ccc gta tct ttg ttg gtt tta gta ccc gat agt gag Phe Ser His Leu Pro Val Ser Leu Leu Val Leu Val Pro Asp Ser Glu 795 800 805 810	2511
ttt tgatccctgc acaggaaagt tagcggcgct actatgaacg atcgatatgt Phe	2564
ctgacaacac tctctcccaa tttggcagtt actaccacga attccgacgt gcccatccca	2624
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Gln Ala Asp Ser Ala Gly Arg Phe Phe Gly Phe Ala Gln Ala Lys Ala
 20 25 30

Gln Leu Pro Tyr Leu Lys Lys Leu Gly Ile Ser His Leu Tyr Leu Ser
 35 40 45

Pro Ile Phe Thr Ala Met Pro Asp Ser Asn His Gly Tyr Asp Val Ile
 50 55 60

Asp Pro Thr Ala Ile Asn Glu Glu Leu Gly Gly Met Glu Gly Leu Arg
 65 70 75 80

Asp Leu Ala Ala Ala Thr His Glu Leu Gly Met Gly Ile Ile Ile Asp
 85 90 95

Ile Val Pro Asn His Leu Gly Val Ala Val Pro His Leu Asn Pro Trp
 100 105 110

Trp Trp Asp Val Leu Lys Asn Gly Lys Asp Ser Ala Phe Glu Phe Tyr
 115 120 125

Phe Asp Ile Asp Trp His Glu Asp Asn Gly Ser Gly Gly Lys Leu Gly
130 135 140

Met Pro Ile Leu Gly Ala Glu Gly Asp Glu Asp Lys Leu Glu Phe Ala
145 150 155 160

Glu Leu Asp Gly Glu Lys Val Leu Lys Tyr Phe Asp His Leu Phe Pro
165 170 175

Ile Ala Pro Gly Thr Glu Glu Gly Thr Pro Gln Glu Val Tyr Lys Arg
180 185 190

Gln His Tyr Arg Leu Gln Phe Trp Arg Asp Gly Val Ile Asn Phe Arg
195 200 205

Arg Phe Phe Ser Val Asn Thr Leu Ala Gly Ile Arg Gln Glu Asp Pro
210 215 220

Leu Val Phe Glu His Thr His Arg Leu Leu Arg Glu Leu Val Ala Glu
225 230 235 240

Asp Leu Ile Asp Gly Val Arg Val Asp His Pro Asp Gly Leu Ser Asp
245 250 255

Pro Phe Gly Tyr Leu His Arg Leu Arg Asp Leu Ile Gly Pro Asp Arg
260 265 270

Trp Leu Ile Ile Glu Lys Ile Leu Ser Val Asp Glu Pro Leu Asp Pro
275 280 285

Arg Leu Ala Val Asp Gly Thr Thr Gly Tyr Asp Pro Leu Arg Glu Leu
290 295 300

Asp Gly Val Phe Ile Ser Arg Glu Ser Glu Asp Lys Phe Ser Met Leu
305 310 315 320

Ala Leu Thr His Ser Gly Ser Thr Trp Asp Glu Arg Ala Leu Lys Ser
325 330 335

Thr Glu Glu Ser Leu Lys Arg Val Val Ala Gln Gln Glu Leu Ala Ala
340 345 350

Glu Ile Leu Arg Leu Ala Arg Ala Met Arg Arg Asp Asn Phe Ser Thr
355 360 365

Ala Gly Thr Asn Val Thr Glu Asp Lys Leu Ser Glu Thr Ile Ile Glu
370 375 380

Leu Val Ala Ala Met Pro Val Tyr Arg Ala Asp Tyr Ile Ser Leu Ser
385 390 395 400

Arg Thr Thr Ala Thr Val Ile Ala Glu Met Ser Lys Arg Phe Pro Ser
405 410 415

Arg Arg Asp Ala Leu Asp Leu Ile Ser Ala Ala Leu Leu Gly Asn Gly
420 425 430

Glu Ala Lys Ile Arg Phe Ala Gln Val Cys Gly Ala Val Met Ala Lys
435 440 445

Gly Val Glu Asp Thr Thr Phe Tyr Arg Ala Ser Arg Leu Val Ala Leu
450 455 460

Gln Glu Val Gly Gly Ala Pro Gly Arg Phe Gly Val Ser Ala Ala Glu
465 470 475 480

Phe His Leu Leu Gln Glu Glu Arg Ser Leu Leu Trp Pro Arg Thr Met
485 490 495

Thr Thr Leu Ser Thr His Asp Thr Lys Arg Gly Glu Asp Thr Arg Ala
500 505 510

Arg Ile Ile Ser Leu Ser Glu Val Pro Asp Met Tyr Ser Glu Leu Val
515 520 525

Asn Arg Val Phe Ala Val Leu Pro Ala Pro Asp Gly Ala Thr Gly Ser
530 535 540

Phe Leu Leu Gln Asn Leu Leu Gly Val Trp Pro Ala Asp Gly Val Ile
545 550 555 560

Thr Asp Ala Leu Arg Asp Arg Phe Arg Glu Tyr Ala Leu Lys Ala Ile
565 570 575

Arg Glu Ala Ser Thr Lys Thr Thr Trp Val Asp Pro Asn Glu Ser Phe
580 585 590

Glu Ala Ala Val Cys Asp Trp Val Glu Ala Leu Phe Asp Gly Pro Ser
595 600 605

Thr Ser Leu Ile Thr Glu Phe Val Ser His Ile Asn Arg Gly Ser Val
610 615 620

Asn Ile Ser Leu Gly Arg Lys Leu Leu Gln Met Val Gly Ala Gly Ile
625 630 635 640

Pro Asp Thr Tyr Gln Gly Thr Glu Phe Leu Glu Asp Ser Leu Val Asp
645 650 655

Pro Asp Asn Arg Arg Phe Val Asp Tyr Thr Ala Arg Glu Gln Val Leu
660 665 670

Glu Arg Leu Gln Thr Trp Asp Trp Thr Gln Val Asn Ser Val Glu Asp
675 680 685

Leu Val Asp Asn Ala Asp Ile Ala Lys Met Ala Val Val His Lys Ser
690 695 700

Leu Glu Leu Arg Ala Glu Phe Arg Ala Ser Phe Val Gly Gly Asp His
705 710 715 720

Gln Ala Val Phe Gly Glu Gly Arg Ala Glu Ser His Ile Met Gly Ile
725 730 735

Ala Arg Gly Thr Asp Arg Asn His Leu Asn Ile Ile Ala Leu Ala Thr
740 745 750

Arg Arg Pro Leu Ile Leu Glu Asp Arg Gly Gly Trp Tyr Asp Thr Thr
755 760 765

Val Thr Leu Pro Gly Gly Gln Trp Glu Asp Arg Leu Thr Gly Gln Arg
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Phe Ser Gly Val Val Pro Ala Thr Asp Leu Phe Ser His Leu Pro Val
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Ser Leu Leu Val Leu Val Pro Asp Ser Glu Phe
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